Born in Maine in 1829, even from his graduation in 1849 he ranked as a mathematical genius, one of the most remarkable America has produced. But he seemed to have no ambition to leave an adequate record of his mental life in print. In personal character he resembled Lobachévsky, whom he intensely admired.

He was spontaneously loyal to the good and the true, enthusiastic, thorough, painstaking. He loved poetry; he loved Shakespeare; he was averse to religious creeds. For Professor Oliver goodness was spontaneous. He did the right not because it was right, but because he intensely wished to do just that. The spring of action seemed a combination of sympathy, perception, knowledge, scientific logic.

In mathematics Professor Oliver worked for the love of it and because he was deeply convinced that mathematics affords that fine culture which the best minds seek for its own sake.

He was a pronounced believer in the non-Euclidean geometry.

I vividly recall how he came up after my lecture on Saccheri at Chicago, and expressing his interest in the most charming fashion, proceeded unhesitatingly to give me a profound lecture on stellar parallax, the measurement of the angles of astronomical triangles and the tests of the quality of what Cayley called 'the physical space of our experience.'

Again, after the Brooklyn meeting of the American Association, he took up the same subject with me, explained a plan for combining stellar spectroscopy with ordinary parallax determinations, and expressed his disbelief that C. S. Pierce had proved our space to be of Lobachévsky's kind, and his conviction that our universal space is really finite, therein agreeing with Sir Robert Ball.

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*JAMES DWIGHT DANA.*

WE take from the authorized account by Professor Edward S. Dana, in the May number of the *American Journal of Science*, the following facts concerning Dana's life. He was born in Utica, N. Y., on February 12, 1813, his father and mother being from Massachusetts. He early showed an interest in natural history, which increased during his course at Yale College from 1830 to 1833. Immediately after graduation, Dana spent fifteen months as instructor in mathematics to the mid-shipmen of the United States Navy, the time being passed in the Mediterranean. He then spent two years at New Haven, being part of the time assistant in chemistry to Benjamin Silliman. The four following years were spent with the exploring expedition sent by the government of the United States under Wilkes to the Southern and Pacific Oceans. The following years were devoted to the study of the material collected. In 1844 he married a daughter of Prof. Silliman, who survives him, and in 1846 became associated with him in the editorship of the *American Journal of Science*. In 1850 Dana was made professor in Yale College. The remainder of his life was spent as teacher, editor, author and investigator.

Dana was President of the American Association for the Advancement of Science in 1852, and was one of the original members of the National Academy of Sciences; he received the Wollaston Medal of the Geological Society of London, the Copley Medal from the Royal Society, and the Walker Prize from the Boston Society of Natural History. He received honorary degrees from the University of Munich, Edinburgh and Harvard. He was a member of the Royal Society of London, the Institute of France, the Royal Academies of Berlin, Vienna and St. Petersburg, and many other societies.

In addition to a large number of papers

printed in the *American Journal of Science* and elsewhere, he is the author of the following works:

A System of Mineralogy, 1837, 1844, 1850.

Zoöphytes, 1846.

Manual of Mineralogy, 1848, 1857, 1878, 1887.

Coral Reefs and Islands, 1853.

Crustacea, 1852–54.

Manual of Geology, 1862, 1874, 1880, 1895.

A Text-Book of Geology, 1864, 1874, 1882.

A System of Mineralogy, 1868.

Corals and Coral Islands, 1872, 1890.

The Geological Story Briefly Told, 1875.

Characteristics of Volcanoes, 1890.

The Four Rocks of the New Haven Region, 1891.

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*CORRESPONDENCE.*

THE EDUCATION OF THE TOPOGRAPHER.

To the Editor of Science: Part of Professor Merriman's review in Science for April 26 interests me as being the direct opposite of my own opinion. He says, apropos of Mr. Gannett's statement that the topographer must be able to generalize through his knowledge of geological processes: "These are dangerous doctrines. The earth exists, the duty of the topographer is to map it truly, and the study of the origin of its features should come later." I should like very much to learn through the columns of Science the opinions of other geographers and topographers on this question.

It is not alone the earth that exists; a large series of topographical maps of various parts of the earth also exist; and through their study the young topographer can learn much about the kind of work he will have when surveying those separate parts of the earth that are not yet mapped. This kind of knowledge will help him in mapping new regions in about the same way that preliminary study of known forms of plants and animals helps the systematist to describe new forms when he finds them.

It is certainly the duty of the topographer to make true maps; but the truest map is always only a generalization. Something is necessarily omitted, and the topographer has to choose between what he shall omit and what he shall represent. He sees many things that he can not map. How shall he be best aided in making on the small sheet of paper before him an expressive map of the broad surface of country around him? I do not say 'an accurate map,' because the word 'accurate' is so generally misunderstood in this connection. It is often taken to imply that the topographer has actually measured every part of the surface of the country and carefully constructed every line on his paper. As a matter of fact, by far the larger part of all maps is sketched, and in the sketching more facts often have to be omitted than can be represented. Hence, everything should be taught to the topographer that will aid him in really seeing the facts that are before him and faithfully representing such of them as come within the limit of the scale he employs.

Nothing is of more assistance in seeing the facts, and in thus making a good beginning towards sketching them properly, than some understanding of their origin and meaning. Hence I believe that the best course of education for topographers while yet in school should include a careful study of the development of land forms, and that the best practical work by topographers will require a very careful and sympathetic study of the origin of the land forms on the ground before him. The prepossession that contour lines bend up-stream has deceived many a topographer into giving a wrong expression to flat alluvial cones. Indifference to the significance and importance of the sharp edge of a gorge or a cliff